UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/788,589	02/27/2004	Ronald S. Karr	VRT0120US	6846

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EXAMINER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
Office Action Summary	10/788,589	KARR ET AL.
	Examiner	Art Unit	
	Daniel Kim	2185	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>05 February 2007</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1,2,4-18 and 20-26</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1,2,4-18 and 20-26</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>27 February 2004</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

        1.☐ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____.

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

STEPHEN C. ELMORE
PRIMARY EXAMINER

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
     Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
     Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

Status

1.   This Office Action is in response to applicant's communication filed February 5,

2007 in response to the PTO Office Action mailed November 6, 2006. The applicant's

remarks and amendments to the claims and/or the specification were considered with

the results that follow.

2.   In response to the last Office Action, no claims have been canceled or added,

and claims 1, 16, 17, 25 and 26 have been amended. Claims 1-2, 4-18 and 20-26

remain pending in this application.

Response to Arguments

3.   Applicant's arguments with respect to claims 1-2, 4-18 and 20-26 have been

considered but are moot in view of the new ground(s) of rejection.

Specification

4.   The disclosure is objected to because:

Note:

        37 C.F.R. 1.75 (d)(1) states that the claim or claims must conform to the
invention as set forth in the remainder of the specification and the terms and phrases
used in the claims must find clear support or antecedent basis in the description so that
the meaning of the terms in the claims may be ascertainable by reference to the
description.

a.   The specification is objected to as failing to provide proper antecedent

basis for the claimed subject matter. See 37 C.F.R. § 1.75(d)(1) and MPEP §

608.01(o). Corrections of the following problem language is required:

1.   In claim 1, line 4, the terms "relate", "related" and "corresponding"

are problematic because while the terms themselves appear in applicant's

disclosure, there does not exist any usage of these terms in such a manner that

the meaning of the terms in the claims may be ascertainable by reference to the

description as is required by 37 C.F.R. § 1.75(d)(1), the result is that it is not

clear what the "relate", "related" and "corresponding" terms specifically entail for

tags of separate IO or write transactions. While applicant briefly mentions in one

embodiment, the first and second tags are "identical", it is unclear if applicant

intends the same concept for tags that "relate", are "related", or are

"corresponding", or whether applicant refers to some other, undefined activity or

relationship. It is unclear what relationship is meant by these terms between tags

of separate write transactions in the case that said tags are not identical.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

5.   Claims 1-2, 4-14, 16-18, 20-24 and 26 are rejected under 35 U.S.C. § 112,

second paragraph, as being indefinite for failing to particularly point out and distinctly

claim the subject matter which applicant regards as the invention. The claims are

indefinite because:

a.   Claims 1, 17 and 26 use the terms "relate" or "corresponds", for which there is lack of proper antecedent basis in the specification, mere repetition of these terms in the disclosure without further explanation, as previously mentioned in the objection to the specification, does not meet the requirement for providing proper antecedent basis for the claimed subject matter (37 C.F.R. § 1.75(d)(1)), therefore, the scope of meaning of the language cannot be ascertained.

b.   In claims 1, 17 and 26, the terms "relate" or "corresponds" are inherently relative terms -- the terms are not defined by the claims, and the specification does not provide a standard for ascertaining the scope of the terms, such that one of ordinary skill in the art would be reasonably apprised of the scope of the invention without the claims including some kind of reference by which "relate" or "corresponds" can be determined, the usage of these terms therefore makes the claims indefinite.

c.   Claims 2, 4-14 and 16 inherit the deficiencies of claim 1.

d.   Claims 18 and 20-24 inherit the deficiencies of claim 17.

Examiner's Note

6.   Previously, in the objection to the specification and claim rejections under 35 U.S.C. 112, it was determined that the meaning of the terms "relate", "related", "corresponds" and "corresponding" are not explained to necessary degree in either the specification or claims themselves. For the purposes of applying prior art in this action, however, examiner will assume these terms are equivalent to "identical". Therefore, language such as "wherein each of the first and second tags relate the first write

transaction to the second write transaction" will be interpreted as "wherein the first and

second tags are identical to each other", as described in claim 15.

Claim Rejections - 35 USC § 102

7.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8.   Claims 1-2 and 15 are rejected under 35 U.S.C. 102(e) as being anticipated by

Fitzgerald et al (US Patent No. 5,787,485).

For claim 1, Fitzgerald discloses a method comprising:

a computer system generating first and second write transactions (the invention

features performing a mirror set copy from a first storage device to a second storage

device in a computer system in which write requests are each associated with a

reference label, col. 1, lines 30-33);

wherein the first and second write transactions comprise first and second tags,

respectively, wherein each of the first and second tags relate the first write transaction

to the second write transaction (the reference label sent with the data to the second

storage device may be associated with a write request that has been received and

processed at the first storage device prior to sending the data, col. 1, lines 57-61);

the computer system transmitting the first and second write transactions,

including the first and second tags, respectively, to first and second storage devices,

respectively (col. 1, lines 57-61);

wherein the first write transaction comprises data D to be written (col. 1, lines 30-

33; the controllers write the data from the write requests to the respective disks so

that… both disks contain identical data, col. 3, lines 13-16);

wherein the second write transaction comprises data D to be written (col. 1, lines

30-33; col. 3, lines 13-16).

Claim 2 is rejected using rationale as per rejection of claim 1 above, where each

storage device may process multiple write requests (col. 2, lines 16-23).

For claim 15, Fitzgerald discloses a method comprising:

generating first and second write transactions (col. 1, lines 30-33);

wherein the first and second write transactions comprises first and second tags,

respectively (col. 1, lines 57-61); wherein the first and second tags are identical to each

other (the second controller may be configured to process write requests by writing data

to the second storage device until a write request associated with the same reference

label as that sent with the data by the first controller is encountered, col. 2, lines 45-49);

the computer system transmitting the first and second write transactions

including the first and second tags, respectively, to first and second storage devices,

respectively (col. 2, lines 45-49; a mirrored data storage system… a first controller

associated with the first storage device, and a second controller associated with the

second storage device, col. 2, lines 25-29);

wherein the first write transaction comprises data D (col. 1, lines 30-33; col. 3,

lines 13-16);

wherein the second write transaction comprises data D (col. 1, lines 30-33; col. 3,

lines 13-16).

Claim Rejections - 35 USC § 103

9.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and ·
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

10.   Claims 4-6, 13-14, 16-18, 20-21 and 24-26 are rejected under 35 U.S.C. 103(a)

as being unpatentable over Fitzgerald et al (US Patent No. 5,787,485) in view of Selkirk

et al (US Patent No. 6,804,755).

For claim 4, Fitzgerald discloses the first storage device receiving the first write

transaction (write requests are received at the first storage device, and also received at

the second storage device, col. 1, lines 32-35); and

the second storage device receiving the second write transaction (col. 1, lines

32-35).

Fitzgerald fails to disclose the remaining claim limitations.

Selkirk helps disclose the first storage device storing in an entry of a first tag

table, the first tag and an identity of the logical block where data D is to be written,

wherein the first tag table is stored in first memory (multi-layer virtual mapping tree

method, col. 9, line 58; multiple layers of mapping tables provide unique identification of

the storage location of data such that individual entries in the mapping tables are

variable and may be made self-defining with respect to the amount of data managed,

col. 10, lines 30-34);

the second storage device storing in an entry of a second tag table, the second

tag and an identity of the logical block where data D is to be written, wherein the second

tag table is stored in second memory (col. 9, line 58; col. 10, lines 30-34).

Fitzgerald and Selkirk are analogous art in that they are of the same field of

endeavor, that is, a system and/or method of memory control. Selkirk suggests that it

would have been desirable to incorporate layered tag tables describing identities of

logical blocks into the system of Fitzgerald because this would provide very fast access

to mapped data locations and still minimize storage required for mapping tables

themselves (col. 9, lines 58-60). Therefore, it would have been obvious to a person of

ordinary skill in the art at the time the invention was made to modify Fitzgerald as

suggested by Selkirk to incorporate the feature as claimed.

For claim 5, Fitzgerald fails to disclose the claim limitations.

Selkik helps disclose the first write transaction comprises data D to be written to

a range of logical blocks of a first storage object (boundary information may consist of,

for example, fixed mapping wherein every entry in the table has the same extent, i.e.

range of virtual space, col. 11, lines 1-3);

the second write transaction comprises data D to be written to a range of logical

blocks of a second storage object (col. 11, lines 1-3).

Fitzgerald and Selkik are analogous art in that they are of the same field of endeavor, that is, a system and/or method of memory control. Selkik suggests that it would have been desirable to incorporate a range of logical blocks for storing objects into the system of Fitzgerald because with storage virtualization, a host server is freed from the restrictions of actual storage mechanisms (col. 9, lines 1-4). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Fitzgerald as suggested by Selkik to incorporate the feature as claimed.

Claim 6 is rejected using rationale as per rejection of claims 1 and 4 above.

For claim 13, Fitzgerald discloses the first write transaction comprises data D to be written to an extension of a first storage object (continuing the mirror set copy, the master controller processes further write requests, col. 4, lines 43-44);

the second write transaction comprises data D to be written to an extension of a second storage object (col. 4, lines 43-44).

Claim 14 is rejected using rationale as per rejection of claims 4 and 13 above.

Claim 16 is rejected using rationale as per rejection of claims 1-2 above, where a reference label is associated with each write request, and therefore "generated" by a "generator" (col. 3, lines 10-13).

Regarding an application executing on the computer system to generate write transactions, Selkirk discloses a method, apparatus and computer program product for performing an instant copy of data to support dynamically changeable virtual mapping schemes in a data processing system (abstract).

Claim 17 is rejected using rationale as per rejection of claim 1 above.

Regarding a computer readable medium storing instructions executable by a

computer system, wherein the computer system implements a method in response to

executing the instructions, Selkirk discloses a method, apparatus and computer

program product for performing an instant copy of data to support dynamically

changeable virtual mapping schemes in a data processing system (abstract).

Claim 18 is rejected using rationale as per rejection of claims 1-2 and 17 above.

Claim 20 is rejected using rationale as per rejection of claims 5 and 17 above.

Claim 21 is rejected using rationale as per rejection of claims 15 and 17 above.

Claim 24 is rejected using rationale as per rejection of claims 13 and 17 above.

Claim 25 is rejected using rationale as per rejection of claim 17 above.

Claim 26 is rejected using rationale as per rejection of claims 1 and 4 above.

Regarding a computer readable medium storing instructions executable by a

computer system, wherein the computer system implements a method in response to

executing the instructions, Selkirk discloses a method, apparatus and computer

program product for performing an instant copy of data to support dynamically

changeable virtual mapping schemes in a data processing system (abstract).

11.   Claims 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Fitzgerald et al (US Patent No. 5,787,485) in view of Selkirk et al (US Patent No.

6,804,755) and further in view of Gaither et al (US PGPub No. 20040098544).

For claim 7, the combined teachings of Fitzgerald and Selkirk disclose the

invention as per rejection of claim 4 above.

These teachings fail to disclose the limitations of claim 7.

Gaither, however, helps disclose comparing the contents of one entry in the first tag table with the contents of entries in the second tag table to determine whether the second tag table includes an entry that matches the one entry (a virtual compression system may be configured to identify units of memory that share identical content among a plurality of partitions, par. 0031; a copy counter may be associated with each entry in a page partition table, and when a new identical page has been determined, the copy counter may be incremented for each entry that references the matching page across the partitions, par. 0032).

Fitzgerald, Selkirk and Gaither are analogous art in that they are of the same field of endeavor, that is, a system and/or method of memory control. Gaither suggests that it would have been desirable to incorporate comparing entries for a match in content into the system of Fitzgerald and Selkirk because otherwise, many of the mass storage partitions may contain duplicate information (par. 0003), and updating respective partition page tables that reference matching pages accordingly may optimize memory systems across partitions (par. 0025). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Fitzgerald and Selkirk as suggested by Gaither to incorporate the feature as claimed.

For claim 8, the combined teachings of Fitzgerald, Selkirk and Gaither disclose the invention as per rejection of claim 7 above.

Gaither further helps disclose copying data, associated with the logical block number identified by the one entry, from the first storage object to the logical block in the second storage object if the second table lacks an entry with contents matching the contents of the one entry (the controller may copy the contents of the matching page to the requested page and forward the requested data to the memory system to perform the write operation, par. 0060).

For claim 9, the combined teachings of Fitzgerald, Selkirk and Gaither disclose the invention as per rejection of claim 7 above.

Gaither further helps disclose deleting the one entry in the first table if the second table contains an entry with contents that match the contents of the one entry (any mapping to duplicate pages is removed and the duplicate pages are returned to a free page pool, which is maintained by the virtual compression system, par. 0019).

Claim 10 is rejected using the combined rationale as in the rejection of claim 9 above.

12.   Claims 11-12 and 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fitzgerald et al (US Patent No. 5,787,485) in view of Selkirk et al (US Patent No. 6,804,755) and further in view of Mattis et al (US Patent No. 6,128,627).

For claim 11, the combined teachings of Fitzgerald and Selkirk disclose the invention as per rejection of claim 1 above.

These teachings fail to disclose the limitations of claim 11.

Mattis, however, helps disclose the computer system generating a write

transaction to write data to a logical block of a data volume;

the computer system incrementing a counter in response to generating the write

transaction (if a matching block is not currently in the process of being created or

destroyed, then the block can be used, and the process increments a write counter,

which is an internal variable, stored in association with the block, that indicates the

number of processor or programmatic objects that are writing the block, col. 34, lines

52-58);

the computer system generating the first and second tags, wherein each of the

first and second tags relate to the first and second write transactions, respectively,

wherein the first and second tags are generated in response to generation of the write

transaction, and wherein the first and second tags are generated as a function of an

output of the incremented counter.

Fitzgerald, Selkirk and Mattis are analogous art in that they are of the same field

of endeavor, that is, a system and/or method of memory control. Mattis suggests that it

would have been desirable to incorporate a write counter into the system of Fitzgerald

and Selkirk because this would indicate the number of processor or programmatic

objects that are writing the block (col. 34, lines 56-58). Therefore, it would have been

obvious to a person of ordinary skill in the art at the time the invention was made to

modify Fitzgerald and Selkirk as suggested by Mattis to incorporate the feature as

claimed.

For claim 12, the combined teachings of Fitzgerald, Selkirk and Mattis disclose the invention as per rejection of claim 11 above.

Mattis further helps disclose the first and second storage devices comprise first and second object storage devices (a cache of information objects comprising a directory table that indexes each of the information objects in one of a plurality of buckets, col. 5, lines 66-67, col. 6, lines 1-2).

Claim 22 is rejected using the combined rationale as in the rejection of claims 11 and 17 above.

Claim 23 is rejected using the combined rationale as in the rejection of claims 12 and 17 above.

Contact Information

13.   Any inquiries concerning this action or earlier actions from the examiner should be directed to Daniel Kim, reachable at 571-272-2742, on Mon-Fri from 10:00am-6:30pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sanjiv Shah, is also reachable at 571-272-4098.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information from published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. All questions

regarding access to the Private PAIR system should be directed to the Electronic

Business Center (EBC), reachable at 866-217-9197.

DK

4-25-07

STEPHEN C. ELMORE
PRIMARY EXAMINER